



Europäisches Patentamt
European Patent Office
Office européen des brevets



(11) Publication number: **0 620 694 A3**

(12)

EUROPEAN PATENT APPLICATION

(21) Application number: **94302721.9**

(51) Int. Cl.⁵: **H04Q 11/00**

(22) Date of filing: **18.04.94**

(30) Priority: **16.04.93 JP 89013/93**

(43) Date of publication of application:
19.10.94 Bulletin 94/42

(84) Designated Contracting States:
DE FR GB SE

(88) Date of deferred publication of search report:
12.07.95 Bulletin 95/28

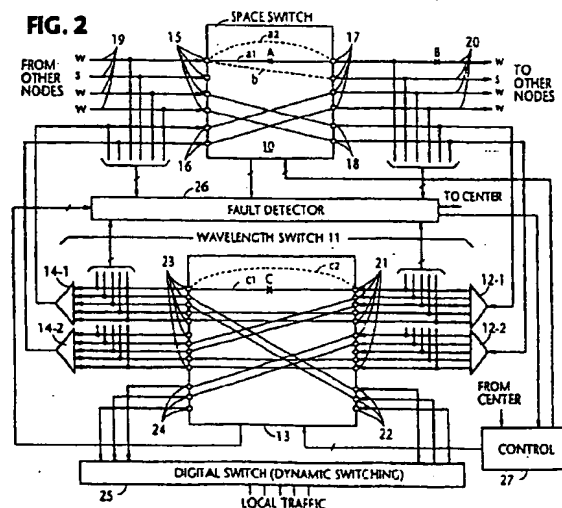
(71) Applicant: **NEC CORPORATION**
7-1, Shiba 5-chome
Minato-ku
Tokyo (JP)

(72) Inventor: **Shiragaki, Tatsuya**
c/o NEC Corporation,
7-1, Shiba 5-chome,
Minato-ku
Tokyo (JP)

(74) Representative: **Orchard, Oliver John**
JOHN ORCHARD & CO.
Staple Inn Buildings North
High Holborn
London WC1V 7PZ (GB)

(64) **Optical cross-connect system with space and wavelength division switching stages.**

(57) In an optical cross-connect system, incoming and outgoing fiber optic trunks carrying WDM signals are terminated to first inlet ports and first outlet ports of an optical space switch. A wavelength division demultiplexer is connected to a second outlet port of the optical space switch and a wavelength division multiplexer is connected to a second inlet port of the optical space switch. A wavelength-divided space switch has first inlet ports connected to the outputs of the wavelength division demultiplexer and first outlet ports connected to the inputs of the wavelength division multiplexer. A time division demultiplexer is connected to a second outlet port of the wavelength-divided space switch and a time division multiplexer is connected to a second inlet port of the wavelength-divided space switch. The outputs of the time division demultiplexer are connected to first inlet ports of a time switch and the inputs of the time division multiplexer are connected to first outlet ports of the time switch. The time switch has second inlet ports and second outlet ports connected to a switched network.



BEST AVAILABLE COPY

EP 0 620 694 A3



European Patent
Office

EUROPEAN SEARCH REPORT

Application Number
EP 94 30 2721

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.5)
X Y	US-A-5 121 381 (TAKAHASHI ET AL) * abstract * * column 2, line 60 - column 43 * * column 5, line 6 - line 11; figures 2,3 *	1,5 2-4,6-14	H04Q11/00
Y	CONFERENCE RECORD, IEEE GLOBAL TELECOMMUNICATIONS CONFERENCE, GLOBECOM '90, 2-5 DEC. 1990, VOL. 2 PAGES 1251-1256, SAN DIEGO US, XP221028 R.W. COUTURE ET AL 'Broadband and Wideband DCS Applications in the Asynchronous and Synchronous Network' * abstract * * page 1252, left column, line 23 - line 32 * * page 1253, left column, line 21 - line 34; figures 1,2 *	2-4,6-14	
A	PROCEEDINGS, INTERNATIONAL SWITCHING SYMPOSIUM 1992, 25-30 OCT. 1992, VOL. 2 PAGES 352-356, YOKOHAMA JP, XP337742 P.J. CHIDGEY ET AL 'Wavelength and Space Switched Optical Networks and Nodes' * the whole document *	1-14	TECHNICAL FIELDS SEARCHED (Int.Cl.5) H04Q
A	CONFERENCE RECORD, IEEE INTERNATIONAL CONFERENCE ON COMMUNICATIONS, ICC '90, 15-19 APR. 1990, VOL. 4 PAGES 1668-1672, ATLANTA US, XP146064 Y. TAKASAKI 'Multiplexing and Transmission for All-Optical Networks' * page 1670, right column, line 34 - page 1671, left column, line 9; figure 6 *	1-14	
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 4 May 1995	Examiner O'Reilly, D
<p>CATEGORY OF CITED DOCUMENTS</p> <p>X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document</p> <p>T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons * : member of the same patent family, corresponding document</p>			

BEST AVAILABLE COPY

EP 0 620 694 A3 (PUB.)



European Patent
Office

EUROPEAN SEARCH REPORT

Application Number
EP 94 30 2721

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cls)
A	FUNKSCHAU, vol.60, no.1, 30 December 1988, MUNCHEN DE pages 54 - 57, XP98165 L. THYLEN 'Opto-Chips für die Telekom-Netze von Morgen' * page 57, left column, line 28 - line 57; figures 5,6 *	1-14	
A	ELECTRONICS LETTERS, vol.23, no.18, 27 August 1987, STEVENAGE GB pages 974 - 976 H. KOBRINSKI 'Crossconnection of Wavelength-Division-Multiplexed High-Speed Channels'	1-14	
A	PROCEEDINGS, IEEE CONFERENCE ON COMPUTER COMMUNICATIONS, "INFOCOM '93", 28 MAR.-1 APR. 1993, VOL. 2 PAGES 578-585, SAN FRANCISCO US, XP399037 K-C. LEE 'Routing and Switching in a Wavelength Convertible Optical Network' * page 579, right column, line 1 - line 8 * * page 580, right column, line 9 - line 21; figures 3,4,6 *		
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 4 May 1995	Examiner O'Reilly, D
<p>CATEGORY OF CITED DOCUMENTS</p> <p>X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document</p> <p>T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons A : member of the same patent family, corresponding document</p>			

EPO FORM 1503 (Rev. 12/93) (P.01/01)

BEST AVAILABLE COPY

THIS PAGE BLANK (USPTO)